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HIGH PERFORMANCE TWO CHANNEL ULTRAVIOLET CAMERA FOR STAR PLANET ACTIVITY RESEARCH CUBESAT (SPARCS)

Abstract

The success of search for exo-solar planets has led to missions in search of habitable exo-solar planets through direct detection and characterization of planets in the habitable zone of stars. The star activity such as stellar flares greatly affect the composition and signatures found in the planet atmosphere. Star-Planet Activity Research CubeSat (SPARCS) observatory is a funded mission by NASA's Astrophysics CubeSat Program. A 6U CubeSat led by Arizona State University (PI Evgenya Shkolnik), SPARCS objective is to provide the UV context for the atmospheric signatures of planets in the habitable zone of M dwarf stars. In depth characterization of the UV environments of M dwarf planets—M dwarfs are the most common of planet hosts in our galaxy—will be crucial to understanding the effects of the star activities on planet atmospheric composition and will help to delineate biological and abiotic sources for observed biosignatures. SPARCS is designed for observation of M stars in two spectral bands in the near ultraviolet (NUV, 260-300 nm) and far ultraviolet (FUV, 150-170 nm). NASA's Jet Propulsion Laboratory is responsible for delivery of the two channel UV camera, SPARCam (Star Planet Activity Research Camera). In addition to its scientific objectives, SPARCS would advance 2D-doped detectors and detector-integrated out-of-band-rejection filter technologies for their potential application in future missions. Two otherwise identical 2D-doped charge coupled device (CCD) detectors are optimized for near ultraviolet (260-300 nm) and far ultraviolet (FUV, 150-170 nm) using custom coatings are the enabling technology of SPARCam. The NUV detector uses a custom antireflection (AR) coating to achieve 70We will present a brief overview of SPARCS and the SPARCam architecture with focus on the high-performance UV detectors for the far ultraviolet and near ultraviolet channels.